Solving Systems by Using Elimination: Day 1 Notes Name: Note Key

Objective: I can solve systems of equations by elimination.

Elimination Method:

1) Multiply equations by a number so that one variable has opposite coefficients.

2) Add the equations to eliminate one of the variables.

3) Solve the resulting equation for the variable.

4) Substitute that answer into either of the original equations to find the value for the other variable.

5) Write solution as an ordered pair (x, y)

Solve by substitution.

a) $x + y = 3$
$+\ x + y = 7$

$2x = 10$
$\frac{2x}{2} = \frac{10}{2}$
$x = 5$

$5 + y = 7$
$-5 \quad -5$
$y = 2$

$(5, 2)$

b) $3x + 3y = 3$
$-x + 3y = -27$

$2x = -24$
$\frac{2x}{2} = \frac{-24}{2}$
$x = -12$

#1) $3(-12) - 3y = 3$
$-36 - 3y = 3$
$+36 \quad +36$
$-3y = 39$
$\frac{-3y}{-3} = \frac{39}{-3}$
$y = -13$

$(-12, -13)$

c) $5x + y = 15$

$(5x + y = 15) -1$

$5x + y = 2$

$-5x - y = -15$

$0 = -13$

No solution

parallel lines

d) $3x - 4y = -5$

$-3x + 4y = 5$

$0 = 0$

infinitely many solutions

same line

Solve.

In a class, 46 students take the SAT exam. The number of boys is 8 more than the number of girls. Write a system that models the situation and solve.

$g + b = 46$

$-g + b = 8$

$2b = 54$

$\frac{2b}{2} = \frac{54}{2}$

$b = 27$

boys: 27
girls: 19

$b = 8 + g$

$-g \quad -g$

$b - g = 8$

$g + 27 = 46$

$-27 \quad -27$

$g = 19$

What kind of coefficients of x and y are needed to solve a system by adding equations?

One needs to be the opposite of the other

you don't need both opposite

Solving Systems by Using Elimination: Day 2 Notes Name: Note Key

Objective: I can solve systems of equations by elimination.

Elimination Method:

1) **Multiply** equations by a number so that one variable has opposite coefficients.
2) **Add** the equations to eliminate one of the variables.
3) **Solve** the resulting equation for the variable.
4) **Substitute** that answer into either of the **original** equations to find the value for the other variable.
5) Write solution as an **ordered pair** (x, y).

If you don't have equal coefficients for both variables, can you still use the elimination method?

Yes, you only need equal coefficients for one so you can multiply one by -1 to cancel it out

Solve by substitution.

a) $3x - 5y = -2$
$(x + 3y = 4)\,-3$

$3x - 5y = -2$
$-3x - 9y = -12$

$-14y = -14$

$\frac{-14y}{-14} = \frac{-14}{-14}$

$y = 1$

$x + 3(1) = 4$
$-3 \quad -3$
$x = 1$

$(1, 1)$

b) $(x + 2y = 6)\,2$
$2x - 4y = -12$
$2x + 4y = 12$

$4x = 0$

$\frac{4x}{4} = \frac{0}{4}$

$x = 0$

$0 + 2y = 6$

$\frac{2y}{2} = \frac{6}{2}$

$y = 3$

$(0, 3)$

c) $3x - y = -1$
$y = 3x - 5$

$-3x \quad -3x$

$y - 3x = -5$

$3x - y = -1$
$-3x + y = -5$

$0 = -6$

No solution

parallel lines

d) $(-4x - 3y = 5)3$ → $-12x - 9y = 15$
$(3x - 2y = -8)4$ → $12x - 8y = -32$

$-17y = -17$

$\frac{-17y}{-17} = \frac{-17}{-17}$

$y = 1$

$3x - 2(1) = -8$

$3x - 2 = -8$

$+2 \quad +2$

$\frac{3x}{3} = \frac{-6}{3}$

$x = -2$

$(-2, 1)$

e) $12x - 8y = 18$
$6x = 4y + 9$

$-4y \quad -4y$

$6x - 4y = 9$

$12x - 8y = 18$
$(6x - 4y = 9)-2$

$12x - 8y = 18$
$-12x + 8y = -18$

$0 = 0$

infinitely many solutions

same lines